struggle, to be a man of high courage, with a real grasp of affairs, and of unwavering loyalty to high ideals and to the truth; and his visit here has been hailed with delight by all men of goodwill.

The State banquet given by the King and Queen at Buckingham Palace on Friday, December 27, in honour of the President and Mrs. Wilson marked an occasion of high significance, not only to the two nations united by it, but also to all free peoples. It was the historic expression of a union formed in a common cause and strengthened by the common purpose of establishing peace and freedom among the communities of the world. "You come," said the King to the President, in proposing the health of the principal guests, "as the official head and spokesman of a mighty Commonwealth, bound to us by the closest ties. Its people speak the tongue of Shakespeare and Milton. Our literature is yours, as yours is also ours, and the men of letters in both countries have joined in maintaining its incomparable glories." In President Wilson the scholar is combined with the statesman, and knowledge is associated with the courage of conviction. He has crossed the Atlantic to promote the spirit of brotherhood in the hearts of men, and "to make the right and the justice to which great nations like our own have devoted themselves the predominant and controlling force of the world." When these ideals are realised, a new epoch in the history of mankind will begin; they were advanced by the exchange of pledges at Friday's banquet and by the hope expressed by the King that the brotherly spirit which brought the response to the call of humanity would "inspire and guide our united efforts to secure for the world the blessings of an ordered freedom and an enduring peace."

It is gratifying to notice that, in addition to members of the Government and other statesmen, the distinguished guests at the banquet included leading representatives of science, as well as of art and literature, among those present being Sir J. J. Thomson (president, Royal Society), Major-Gen. Sir George Makins (president, Royal College of Surgeons), and Dr. Norman Moore (president, Royal College of Physicians).

NOTES.

THE list of New Year honours includes the following names of men known in scientific circles:—*Baronet:* Sir Lewis Amherst Selby-Bigge. *Knights:* Dr. W. Leslie Mackenzie, medical member of the Local Government Board for Scotland; Dr. G. D. Thane, principal inspector under Cruelty to Animals Act, Home Office; Dr. Prafulla Chandra Rây, Indian Educational Service, Bengal; and Col. Sir Almroth E. Wright, Army Medical Service. *K.C.V.O.:* Sir George Anderson Critchett, surgeon oculist to the King. *C.S.I.:* Dr. H. H. Hayden, director of the Geological Survey of India. *C.B.:* Mr. C. E. Ashford, headmaster, Royal Naval College, Dartmouth; Mr. P. W. L. Ashley, assistant secretary (Department of Industries and Manufactures), Board of Trade; and Dr. R. B. Low, assistant medical officer, Local Government Board. *C.M.G.:* Mr. Frank Tate, Director of Education, Victoria. *C.I.E.:* Lt.-Col. J. T. Calvert, principal, Medical College, Calcutta; Dr. W. Crooke; Mr. C. G. Roberts, Chief Conservator of Forests, Burma; Mr. T. R. D. Bell, Chief Conservator of Forests, Bombay; Mr. W. F. Perree, Conservator of Forests, Kumaon, United Provinces; Mr. B. B. Osmaston, president, Forest Research Institute and College, Dehra Dun; and Prof. J. C. Lamont, professor of anatomy, Medical College, Lahore, Punjab.

AT the annual meeting of the English Forestry Association held on December 18, Major G. L. Courthope, the president, gave some interesting details on the timber requirements of the Government and the available supplies existing in the country. The position is sufficiently serious to require earnest attention. The Timber Supply Department, the president said, was anxious to close down as soon as possible, but the Government looked to it to ensure the supplies which would be required during 1919. The demand alone next year, irrespective of commercial and trade demands, was expected to amount to 100,000 standards a month. There was nothing approaching that quantity in this country. The Department had rather more than a year's supply on the stump, calculated on the basis of the existing rate of output. The Controller of Timber Supplies had informed them that the shipping position was getting easier, but it would be some time before anything like adequate supplies of imported timber could be expected. There was a world shortage, and the countries which had supplies of converted material were holding them up for better prices. The foreign forestry workers (Portuguese, Finns, etc.) were being demobilised, and the demobilisation of the Canadian Forestry Corps was soon to take place. In their stead 16,000 demobilised British soldiers would be employed. It was certain that this country would require from 300,000 to 350,000 standards for reconstruction purposes during the next twelve months. In the United Kingdom there were something like 4½ million standards remaining standing. We imported 3,000,000 standards in 1913 alone. Lord Selborne said that if British landowners had not been far-sighted and public-spirited enough for generations past to carry on their plantings, in the absence of any public encouragement of any kind, this country would have been far more handicapped in carrying on the war than had been the case. The existence of the woods in Great Britain had saved the shipping situation on one hand and the coal situation on the other.

WE regret to learn, from the *Journal des Observateurs,* that M. Luizet, assistant at the Lyons Observatory, died on November 20, 1918. M. Luizet's special field was the observation of variable stars, and he prepared reports on this subject which have appeared from time to time in the *Journal.*

WE regret to notice the death on December 23, as the result of an accident, of Dr. Leonard G. Guthrie, distinguished by his work in nervous diseases and the history of medicine. Dr. Guthrie delivered the Fitzpatrick lectures at the Royal College of Physicians in 1907–8, and as secretary and vice-president of the section of medical history at the Royal Society of Medicine he did much to further that branch of research. He was president of the Harveian Society of London in 1913–14.

THE first lecture of the second series arranged by the Industrial Reconstruction Council will be held in the Saddlers' Hall, Cheapside, E.C.2, on Wednesday, January 8. The chair will be taken at 4.30 by the

Marquess of Crewe, K.G., and a lecture entitled "Industrial Unity" will be delivered by the Right Hon. G. H. Roberts, M.P., Minister of Labour. Applications for tickets should be made to the Secretary, I.R.C., 2 and 4 Tudor Street, E.C.4.

AT the general meeting of the Scottish Meteorological Society, held on December 19, the following officers and other members of council were elected for the ensuing twelve months:—*President:* Dr. C. G. Knott. *Vice-Presidents:* Prof. T. Hudson Beare and Mr. J. Mackay Bernard. *Council:* Mr. D. A. Stevenson, Mr. R. Cross, Mr. S. B. Hog, Mr. G. Thomson, Dr. A. Crichton Mitchell, Mr. G. A. Mitchell, Mr. M. M'Callum Fairgrieve, Prof. R. A. Sampson, and Capt. T. Bedford Franklin. *Hon. Secretary:* Capt. E. M. Wedderburn. *Hon. Treasurer:* Mr. W. B. Wilson.

IN *Helvetica Chimica Acta,* No. 4, appears an obituary notice of Prof. R. Nietzki, who for many years occupied the chair of chemistry at the University of Bâle, and had become noted for his work on the chemistry of certain groups of dyestuffs. Prof. Nietzki was born in 1847, and studied pharmacy in his early career. Later he became an assistant to A. W. Hofmann, and in 1876 held a similar position at Leyden, where he began the researches on colouring matters to which much of his life was afterwards devoted. He discovered nitranilic acid, and worked out the methods of preparing quinone and hydroquinone which are still employed for making these articles. In 1879 Prof. Nietzki accepted the post of research chemist with a firm at Biebrich, and signalised his appointment by the discovery of the dyestuff known as "Biebrich Scarlet," of which notable quantities are produced at the present time. He went to Bâle in 1884, and in association with his students continued his researches until ill-health brought about his retirement in 1911. The notice of his death, which occurred in September, 1917, is contributed by Prof. Noelting, who includes in it an important summary of Prof. Nietzki's investigations on aniline black, the quinones, azo-derivatives, safranines, oxazines, thiazines, and other groups of organic compounds.

DR. CHARLES R. VAN HISE, long connected with the United States Geological Survey, died on November 19 last, aged sixty-one years. His work, aided by the liberal system of Government publication at Washington, may be truly described as monumental. In 1883 he was called on to examine the iron-ore region of Lake Superior, under R. D. Irving, and five years later this work came under his control. His important summary of the grouping of the iron-ores appeared in 1897 (21st Ann. Rep., U.S. Geol. Survey, part 3), accompanied by a monograph on "The Marquette Iron-bearing District," in which W. S. Bayley co-operated. This monograph, No. 28, contains descriptions and an admirable series of coloured illustrations of siliceous banded iron-ores, which are of fundamental importance for comparison with similar rocks throughout the world. Dr. Van Hise extended the petrography of this subject in 1911 in his monograph (No. 52) on "The Geology of the Lake Superior Region," in collaboration with C. K. Leith. We owe to this work the experimental investigation of Leith's "greenalite," a marine silicate distinct from glauconite, and a close consideration of how far the magnetite in the bedded ore-deposits is a product of reduction from iron carbonate or greenalite, or how far it may be ascribed to transference from intrusive basic rocks. Meanwhile, Dr. Van Hise had issued his great "Treatise on Metamorphism" (Mon. 47, 1904), in which he reviewed all the changes undergone by rocks since their first stage of deposition or consolidation. Such varied subjects as the disintegrating action of white ants, the decomposition of silicates, and the flow of rocks under pressure, come within the range of this comprehensive work. Pre-Cambrian formations naturally attracted much of Dr. Van Hise's attention; but his range of reading was wide, and his duties as president of the University of Wisconsin brought his experience as an administrator into a high educational field.

WE regret to announce the death of Mr. J. P. Johnson at Johannesburg from pneumonia, following an attack of influenza, at the early age of thirty-eight. Mr. Johnson was born in London in 1880, and was educated at Dulwich College and the Royal School of Mines. In 1902 considerations of health compelled him to emigrate to the Transvaal. On the outbreak of the war he was living in Tasmania, where he intended to settle, but returned to South Africa, where he died on October 18, 1918. At an early age Mr. Johnson was an enthusiastic student of the Pleistocene deposits of England and of stone implements, and several papers were contributed by him to the Proceedings of the Geologists' Association, the *Geological Magazine,* the *Essex Naturalist,* and *Science Gossip.* He was a born hunter, and made many important additions to the Pleistocene faunas of West Wittering and Ilford and the Eocene fauna of Walton-on-the-Naze. In South Africa he found an almost virgin field, and the results of his work were embodied in "The Stone Implements of South Africa" (1907, second edition 1908), "Geological and Archæological Notes on Orangia" (1910), "The Prehistoric Period in South Africa" (1910, second edition 1912), and numerous papers published by the Geological Society of South Africa, the South African Association, the British Association, and in the columns of NATURE. Mr. Johnson was a member of the council of the Geological Society of South Africa, and was appointed by the South African Government a member of the Commission to report on the petroglyphs and rock-paintings of South Africa, many of which are reproduced in "The Prehistoric Period in South Africa" (second edition). He was also a keen student of the ethnography of South Africa, and his conclusions are embodied in the same work, of which a third edition was in hand at the time of his death. In his profession as a mining expert Mr. Johnson was greatly respected, and his services were urgently sought for by prospecting syndicates, whilst his works on "The Mineral Industry of Rhodesia" and "The Ore Deposits of South Africa" are standard books.

THE party of American technical journalists recently on a visit to this country as guests of the Government was entertained by the Master and Wardens of the Worshipful Company of Stationers on December 18, together with a gathering of British colleagues. The meeting had been arranged by the Institute of Journalists' Circle of Scientific, Technical, and Trade Journalists, and, in spite of the unavoidably short notice arising from some uncertainty regarding the return of the American party after its tour in France, a considerable number of editors of technical papers in London were present. After tea and a reception a meeting was held, at which Mr. H. C. Parmelee, Mr. S. O. Dunn, Mr. H. Cole Estep, Mr. H. M. Swetland, and Mr. A. J. Baldwin delivered short addresses on behalf of the American technical journalists, while Mr. L. Pendred, Prof. R. A. Gregory, and Mr. A. C. Meyjes responded for the British technical Press. It was very pleasant to note, in the addresses of our friends from the United States, that they were entirely at one with us in their appreciation of the importance of the duties which the technical Press can perform. Some striking instances of the services rendered in connection with the war and their influence on the industrial development were given, and stress was laid on the value of wide and thorough training, with the view of raising the status of technical journalism as a profession. A resolution was moved by Mr. H. C. Parmelee, seconded by Mr. A. C. Meyjes, and carried unanimously, urging the desirability of closer co-operation and periodical exchange of views between the trade and technical Press in the two countries. Mr. L. Gaster, chairman of the circle, who presided, voiced the pleasure of the meeting in welcoming the guests, and Mr. A. J. Baldwin expressed the hope that British technical journalists would reciprocate by sending a deputation to the United States in the near future.

In the *Scientific Monthly* for November (vol. vii., No. 5) Dr. Philip A. Means describes the social conditions of the Piura-Tumbes region of northern Peru. The population is divided on ethnic lines into three groups: pure Indians, pure whites, and mestizos (*i.e.* those of mixed ancestry). The landowners are, for the most part, of the white races; the Indians are engaged either in agriculture for the landowners or on the coast in fishing; while the mestizo class is occupied in shop-keeping, hotel-keeping, and kindred employments. In spite, however, of the excellent climate and the abundance of fruits and vegetables, the condition of most of the people is far from idyllic; their houses are often wretched huts indescribably dirty, while their personal habits are so unclean as to encourage disease. The author makes a plea for a benevolent paternalism in government, aiming at building up a wholesome, sane, and virile peasantry. The people have a peculiar aptitude for hand-weaving, which, if rightly encouraged, might both make the region world-famous for woven fabrics and help to develop the inhabitants. Excellent cotton and wool are already produced there, and with proper scientific study silk and flax could be grown in large quantities. Dr. Means suggests that the genius of the people for hand-weaving should not be suppressed by the introduction of mechanical methods, but encouraged, and in time, with the right sort of loom, the inhabitants would quickly show the world new kinds of cloth by new combinations of material. Tile-making he would also encourage. Other interesting suggestions for the development of this region are put forward in the article—suggestions which are pertinent to regions other than that of Piura-Tumbes.

The rapid increase and spread of the great crested grebe in Warwickshire forms the subject of a short paper by the late Mr. Geoffrey Leigh in *British Birds* for December. On the majority of pools already in use the number of breeding pairs is increasing yearly, whilst fresh sheets of water are being constantly occupied. The author expresses the opinion that this species is, as a rule, double-brooded. This increase apparently dates from about the year 1900, and it is to be hoped that it will receive no check.

In the *Irish Naturalist* for November–December Mr. R. F. Scharff expresses the opinion that the red deer found in Ireland to-day are the descendants of the indigenous stock of the island, and casts doubt on the trustworthiness of the statement that red deer were imported into Ireland during the thirteenth century from England. There can be no room for doubt that in prehistoric times the red deer roamed in great numbers all over the island, and the author holds that it is unlikely that in the thirteenth century this native race would have been so reduced as to need reinforcement.

That the Zoological Society of London has come through a time of severe stress and anxiety with remarkable success there can be no question, even though, as announced at the monthly general meeting held on December 1, there has been a great falling off in admissions to the gardens during 1918 as compared with the corresponding period for 1917. There has also been a similar decrease in the number of fellows elected and re-elected. We may, however, anticipate a steady and lasting improvement now that the disturbing factors are disappearing. The most important addition to the gardens during December was a Kea parrot (*Nestor notabilis*).

Many years ago it was pointed out by Prof. Bryan in *Science Gossip* that the pollen-grains of certain plants exhibit marked "black-cross" effects in polarised light. The Journal of the Royal Microscopical Society for September last contains an abstract of a paper by Mr. F. J. Keeley in the Proceedings of the Academy of Natural Sciences of Philadelphia dealing with polariscopic effects produced by certain diatoms. These effects, which were previously discussed by Mr. E. M. Nelson, are probably attributable to internal reflections, an explanation which may, perhaps, apply equally well to the pollen. The existence of these effects in *Actinocyclus ralfsii* has led to Mr. Keeley observing an exceedingly delicate secondary structure in this optically remarkable diatom.

The preservation of game-birds in its relation to agriculture has for some time past become a subject of political controversy, and it is therefore gratifying to find the subject treated in a scientific spirit by Dr. Walter E Collinge, of St. Andrews, in *Science Progress* for October last. Dr. Collinge has conducted an extensive series of examinations of the contents of the crops of the three principal game-birds, namely, the pheasant, red grouse, and partridge. The proportions of animal matter are 37·4, 22·5, and 40·5 per cent. respectively, this consisting mainly of injurious insects, with very small percentages of worms, slugs, and non-injurious insects. Of the vegetable matter the percentages of grain are 2·4, 1·5, and 3·5, the great bulk being described as "leaves, stems, and seeds of weeds." In view of the benefits which these game-birds are capable of conferring upon agriculture, Dr. Collinge contends that, apart from all other considerations, their preservation is a question of urgent national importance. On the other hand, he advocates the systematic destruction of other species of birds, such as the house-sparrow, rook, and starling, which are costing the country millions of money in the food products destroyed

In the Kew Bulletin, No. 7, a further instalment of "Notes on the Flora of Madras" is published by Mr. J. S. Gamble, the author of the flora now in course of publication. These notes deal with the natural families and genera which form part ii. of the flora, "Celastraceæ to Leguminosæ—Papilionatæ," which has recently been published. Among plants of unexpected occurrence in Madras may be mentioned *Leea aequata*, which is found in Bengal and Burma, and *Turpinia nepalensis* (Staphyleaceæ), a Himalayan mountain species found in the Madras mountains. Mr. Gamble proposes six species of the difficult genus Nothopegia; one of these, *N. dalzelli*, was originally described by Dalzell in 1849 as a new genus, Glycycarpus, and about three of the others there has been considerable confusion, now admirably settled by Mr. Gamble's careful researches. In the same issue he describes ten new species of South Indian Rosaceæ, Myrtaceæ, and Melastomaceæ.

THIS year, 1919, which is the centenary of the founding of the settlement of Singapore by Sir Stamford Raffles, marks also the sixtieth anniversary of the establishment of the Botanic Gardens. In the year 1859, on November 12, the Singapore Agri-Horticultural Society was formed, and received the support of the Governor, Col. O. Cavanagh, who afterwards became chairman of the committee of management. Within six weeks of the formation of the society some fifty-six acres of abandoned Government land were granted, as well as convict labour for setting in hand the cultivation of the garden site. The history of the establishment of the gardens is given in the Gardens Bulletin, Straits Settlements, vol. ii., No. 2, with a map showing the area granted to the Agri-Horticultural Society in 1859, and the further grant of land in 1866. The site is still occupied by the Botanic Gardens. Originally the society hoped to benefit local agriculture, but as its first object it set about preparing a pleasure garden for public resort. Between the years 1870–74 the society appears to have lost interest in the gardens, and have got into difficulties, so much so that in 1874 it offered to hand over the gardens to the Government. This was done in December, 1874, and the advice of Sir Joseph Hooker, then director of the Royal Gardens, Kew, was sought as to a superintendent. In October, 1875, the new superintendent, James Murton, selected by Hooker arrived in Singapore with a large supply of plants, and carried on the able work done by Lawrence Niven, the first superintendent, to whom the general lay-out of the gardens is due. From Murton's day to the present time the Singapore Botanic Gardens have become renowned as the centre of Great Britain's botanical activity in the Far East.

THE September issue of the *Scientific Australian* gives the results of the tests of New South Wales timber made by Prof. Warren, of the University of Sydney, for the Defence Department of the Commonwealth Government. The three timbers tested gave the following mean values for the modulus of rupture in lb. per square inch:—Ironbark, 29,000; blue gum and spotted gum, each 22,000. These values compare favourably with those found in the United States Government tests of American hickory, of which seven varieties gave mean values of from 12,000 to 19,000, while each variety showed a wide range of quality. It seems desirable that the great strength of these New South Wales timbers should be known to engineers in this country.

SAWDUST, chips, and shavings are largely utilised in Germany for the production of alcohol. It is estimated that from half a million to one million tons of such waste material are produced annually in that country. Four distilleries are at present being run on these raw materials, each having fifty-one autoclaves of 1000-kg. capacity. The cost of production is said to be high when the residue cannot be used as cattle fodder or the waste liquors used for other products. The material is heated in an autoclave with either sulphurous or hydrochloric acid for from twenty to forty minutes at 265° C. at a pressure of 7 atm., then quickly drawn off, neutralised, and run into the fermenting vat, beer-yeast being used. Distillation completes the process. Further particulars are given in *Zeitschrift für angewandte Chemie* for September 13 last.

IN *Elektrotechnik und Maschinenbau* for September 1 are given the results of some investigations by Gumlich on the magnetic properties and resistance of iron alloys. The samples consisted of pure electrolytic iron and four series of alloys with increasing carbon content (up to 1·8 per cent.). The density and specific resistance vary with the percentage of added material. The tests also showed that the magnetic properties of iron are not improved appreciably by the addition of silicon and aluminium. The benefit derived by the presence of these materials is only due to secondary causes by virtue of the removal of oxygen and neutralisation of the effect of carbon. Eddy-current losses are reduced by the addition of silicon and aluminium. The effect of the added materials on the coercive force is also examined. Good permanent magnets may be produced by adding tungsten, chromium, or molybdenum.

THE second number of the *Decimal Educator,* a quarterly publication of the Decimal Association, contains extracts from several articles by prominent writers in favour of the metric system of weights and measures, including the article by "A. F. B." which appeared in NATURE for August 30, 1917. In connection with the misapprehension which is often to be found in industrial circles regarding the difficulties and expense that would be involved in the compulsory adoption of the metric system, it is pointed out that the proposals of the advocates of the system do not include any obligation to use metric measures in manufacturing operations, but only in commercial transactions. Many useful hints for lecturers on the metric system are to be found in the article on teaching the system, which is continued in this issue. The undesirability of over-elaborating the difference between the values of corresponding metric and imperial denominations is insisted upon, and it is shown that in most cases there are simple approximate relations which will suffice for all practical purposes. An account is given of the present stage of the proposal for introducing decimal coinage, and from correspondence which appears in this issue it would seem that the movement is receiving considerable support throughout the country.

WE have received a letter from Dr. G. C. Simpson, meteorologist to the Government of India, on the subject of aurora at low heights in the atmosphere, supplementary to one from him which appeared in NATURE of September 12 last (p. 24). Dr. Simpson now informs us that the Scott Antarctic Expedition of 1911–12, of which he was a member, had with it "a complete equipment for determining auroral heights by Prof. Störmer's photographic method, but, unfortunately, the experiments made were unsuccessful." In some comments on Dr. Simpson's previous letter Dr. Chree expressed the hope that the observers of the next Arctic or Antarctic expedition would be familiar with what had been written on the subject, and be specially careful in dealing with any apparently low-level aurora. Dr. Simpson is apprehensive lest this should be supposed to imply censure on the observers of the Scott expedition. We can assure him that no reflection whatever was intended on the observers of *any* previous expedition. The subject, as Dr. Simpson's letter alone would suffice to show, is beset with pitfalls for the unwary, and it is important that *future* observers should realise adequately the completeness of the evidence necessary to establish the existence of aurora at really low levels. Dr. Simpson's own writings on the subject form part of the literature the study of which we should like to recommend.

THE *Engineer* of December 20 reviews the project known as the Georgian Bay Canal, which will probably be undertaken by the Canadian Government at an early date, now that the war has ceased to impose a veto on civil engineering enterprise. The design of the waterway in question is to link up the arm of Lake Huron, called Georgian Bay, with the St Lawrence River at Montreal. It will undoubtedly prove a great convenience for water-borne grain traffic, which at present is conveyed from Fort William and Fort Arthur on Lake Superior to Montreal *via* Lakes Huron, Erie, and Ontario. The new route, embracing a total distance of 440 miles from the entrance at the mouth of French River to the city of Montreal, will constitute a saving of 282 miles. There are naturally 346 miles of navigable lake and river and 66 miles of channel, in which the requisite depth can be obtained by dredging, leaving 28 miles only of canal to be constructed. There is a rise of 98 ft. between Georgian Bay and the summit level at Trout Lake, which will be surmounted by four locks from 21 ft. to 29 ft. in lift. Succeeding this there is a fall of 659 ft. to the St. Lawrence River, necessitating twenty-three locks from 5 ft. to 50 ft. in range. The intention is to provide a waterway 22 ft. deep, to accommodate lake boats 600 ft. long, 60 ft. beam, and 20 ft. draught. The estimated outlay is 100,000,000 dollars, and the work of construction will probably take ten years to complete. The canal project will materially alter the regimen of the Ottawa River, which forms the major portion of the route. At present it is a series of deep and wide basins, connected by narrow passages, which are broken by falls and heavy rapids. For the purpose of lockage, the falls are to be concentrated and all the small rapids eliminated. The forty-five dams required for the regulation of navigation (eighteen are of considerable size) will serve to concentrate the water-power at certain points, and it is computed that nearly a million horse-power will thereby become available, though possibly not more than 150,000 h.p. at minimum flow could be developed under existing conditions.

THE "Wellcome Photographic Exposure Record and Diary" for 1919 is issued by Messrs. Burroughs Wellcome and Co. as usual. Those who are in the habit of using this pocket-book will probably be surprised to find that the exposure calculator is improved, so that when set it shows the exposure required for all the ordinary apertures of lenses instead of one only, and that this is facilitated by printing the figures in different colours. The diary, the space for classified exposures, and the pages for notes and memoranda remain as before, while the tables of the sensitiveness of the various plates and papers on the market and the general information on photographic procedure are brought up to date. The book is a model of compactness and usefulness.

OUR ASTRONOMICAL COLUMN.

SCHORR'S COMET.—The following continuation of the ephemeris of this comet, for Greenwich midnight, is from the elements given in NATURE for December 19, 1918:—

	R.A. h. m. s.	N. Decl. ° ′	Log *r*	Log Δ
Jan. 2	3 57 47	13 45		
6	3 58 20	14 3	0·4015	0·2390
10	3 59 16	14 22		
14	4 0 33	14 41	0·4144	0·2751
18	4 2 13	15 0		
22	4 4 12	15 19	0·4271	0·3104
26	4 6 22	15 38		
30	4 8 53	15 57	0·4394	0·3448

Magnitude 15.

The following observations have been received:—

G.M.T.	R.A. h. m. s.	N. Decl. ° ′ ″	Observer	Observatory
Nov. 29·8297	4 7 37·6	11 47 47	Burton	Washington (Naval)
30·6602	4 7 4·2	11 49 47	,,	,, ,,
30·7466	4 6 59·5	11 49 56	Barnard	Yerkes

BORRELLY'S COMET.—This comet was observed by Mrs. Freeman with a 3-in. telescope on December 23. It is now growing fainter, but should be observable until the end of January:—

Ephemeris for Greenwich Midnight.

	R.A. h. m. s.	N. Decl. °	Log *r*	Log Δ
Jan. 5	6 41 18	60 19	0·1776	9·7803
9	6 36 45	62 3	0·1825	9·8026
13	6 32 34	63 20	0·1876	9·8256
17	6 29 43	64 30	0·1930	9·8488
21	6 27 27	65 16	0·1984	9·8717
25	6 26 38	65 48	0·2041	9·8947
29	6 26 50	66 7	0·2098	9·9171

"THE COMPANION TO THE OBSERVATORY, 1919."—This useful work of reference is similar in form to recent issues. In addition to a summary of data from the Nautical Almanac, it contains Mr. Denning's list of meteor radiants for every night of the year, and ephemerides of variable stars classified into five types (Long Period, Algol, *β* Lyræ, Cluster, and Cepheid). The pages on double stars are due to Mr. Jonckheere; he gives recent observations of 128 pairs and ephemerides for 44. There are several tables of astronomical constants. The magnetic elements for Greenwich direct our attention to the increase in the rate of change in the westerly declination. It is now diminishing at the rate of 1° in six years, and should reach zero about the end of the century.

A misprint on p. 7 may be noted. The dates of planetary quadrature and station are all printed a line too high, opposite the wrong planet's name.

REDETERMINATION OF THE ORBIT OF 588 ACHILLES.—Mme. Julie M. Vinter Hinsen undertook the rediscussion of the observations of this number of the Trojan group made during the decade succeeding its discovery in 1906 (Copenhagen Observatory Publications, No. 29). Some trouble was caused by the fact that the object observed in October, 1914, proved not to be identical with Achilles. Omitting this, all the remaining normal places could be satisfied with no errors exceeding 6″. The following is the final orbit:—

Epoch and Osculation 1907 May 28 Berlin Mean Noon.

$$\begin{array}{l} M = 84^\circ\ 3'\ 1{\cdot}9'' \\ \left.\begin{array}{l} \omega = 125^\circ\ 36'\ 22{\cdot}4'' \\ \text{☊} = 315^\circ\ 35\ 58{\cdot}5'' \\ i = 10^\circ\ 18'\ 13{\cdot}7'' \end{array}\right\} 1910{\cdot}0 \\ \phi = 8^\circ\ 36'\ 13{\cdot}1'' \\ \mu = 295{\cdot}96333'' \\ \log a = 0{\cdot}719179 \end{array}$$

THE MANCHESTER EXHIBITION OF BRITISH SCIENCE PRODUCTS.

ON Thursday, December 26, there was opened without ceremony, in the Municipal College of Technology, Manchester, a replica of the British Scientific Products Exhibition held in August and September last in King's College, London, under the auspices of the British Science Guild. The London exhibition attracted much attention and commanded a large attendance of the public interested in the progress of applied science in the United Kingdom, especially as a result of the circumstances induced by the war. It proved that much had been accomplished despite unfavourable conditions as to the supply of certain products, some of them of prime importance, inasmuch as they rank as "key" products upon which certain great industries depend for their successful prosecution.

It was felt that the exhibition should be brought